

WHAT IS CLAIMED IS:

1. A self-ligating lingual orthodontic bracket, comprising:
  - a base comprising a base surface adapted for coupling to a lingual surface of a tooth in a person's arch;
  - 5 a first flange extending generally horizontally from the base in a generally lingual direction;
  - a second flange extending generally horizontally from the base in a generally lingual direction, the second flange separated from the first flange generally vertically toward the person's occlusal plane to define a generally transverse wire slot that is
  - 10 exposed on a lingual side of the bracket and adapted to receive an orthodontic wire inserted into the wire slot from the lingual side of the bracket;
  - a clip slot formed generally vertically through the bracket; and
  - a flexible retaining clip adapted to secure the orthodontic wire within the wire slot in a self-ligating manner, the retaining clip:
    - 15 comprising a first portion positioned generally vertically and adapted to move generally vertically within the clip slot toward or away from the occlusal plane, a second portion extending generally horizontally from the first portion in a generally lingual direction about at least a central portion of the second flange, and a third portion extending generally vertically from the second portion in a direction
    - 20 generally away from the occlusal plane about at least the central portion of the second flange;
    - adapted to apply a resilient force to an object positioned between the first and third portions;
    - adapted to be urged generally vertically toward the occlusal plane from
    - 25 a closed position to an open position to expose the wire slot to receive the orthodontic wire, the third portion being biased against at least the central portion of the second flange when the retaining clip is in the open position due to the applied resilient force; and
    - adapted to be urged generally vertically away from the occlusal plane
    - 30 from the open position to the closed position to secure the orthodontic wire within the wire slot, the third portion being biased against the orthodontic wire when the

retaining clip is in the closed position and the orthodontic wire is secured within the wire slot due to the applied resilient force.

2. The bracket of Claim 1, wherein the first portion of the retaining clip  
5 comprises an angled free end extending generally vertically out of the clip slot in a direction generally away from the occlusal plane and adapted to contact the bracket to limit movement of the retaining clip toward the occlusal plane as the retaining clip is urged from the closed position to the open position.

10 3. The bracket of Claim 1, wherein the second portion of the retaining clip is adapted to contact the central portion of the second flange to limit movement of the retaining clip away from the occlusal plane as the retaining clip is urged from the open position to the closed position.

15 4. The bracket of Claim 1, wherein:  
the central portion of the second flange comprises a detent; and  
the third portion of the retaining clip comprises an angled free end adapted to rest within the detent of the central portion of the second flange when the retaining clip is in the open position to prevent unintentional movement of the retaining clip  
20 away from the occlusal plane.

5. The bracket of Claim 1, wherein the first flange comprises a recess adapted to:  
receive a free end of the third portion of the retaining clip when the retaining  
25 clip is in the closed position; and  
limit movement of the free end of the third portion in a generally lingual direction to prevent the orthodontic wire from escaping from the wire slot when the retaining clip is in the closed position.

6. The bracket of Claim 1, wherein at least one of the first and third portions of the retaining clip comprises a notch adapted to receive a tool for urging the retaining clip toward the occlusal plane from the closed position to the open position.

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7. The bracket of Claim 1, wherein the second flange provides a bite plate adapted to contact an occlusal surface of an opposing tooth in the person's opposing arch to limit movement of the tooth toward the opposing tooth.

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8. The bracket of Claim 1, further comprising a hook extending from a side of the first flange in a direction generally away from the occlusal plane, the hook comprising a ball-shaped free end adapted to engage with an elastomer operable to pull the bracket in a generally transverse direction toward an adjacent bracket.

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9. The bracket of Claim 1, wherein the tooth is an upper tooth in the person's upper arch and the retaining clip is adapted to be urged generally down into the open position and generally up into the closed position.

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10. The bracket of Claim 1, wherein the orthodontic wire may have either a circular cross-section or a rectangular cross-section.

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11. The bracket of Claim 1, wherein the wire slot and retaining clip are adapted to accommodate any of a plurality of orthodontic wires with different cross-sectional dimensions.

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12. The bracket of Claim 1, wherein:  
the second flange comprises mesial and distal arms defining a central gap through which the third portion of the retaining clip moves about the central portion of the second flange;  
the third portion of the retaining clip covers substantially all of a lingual surface of the central portion of second flange; and  
a lingual surface of the third portion of the retaining clip is entirely exposed.

13. The bracket of Claim 1, wherein:  
the second flange is continuous between its mesial and distal sides;  
the third portion of the retaining clip covers substantially all of a lingual  
5 surface of the second flange between its mesial and distal sides; and  
a lingual surface of the third portion of the retaining clip is entirely exposed.

14. The bracket of Claim 1, wherein:  
the second flange extends in the lingual direction past the first flange to  
10 provide an extended bite plate adapted to contact an occlusal surface of an opposing  
tooth in the person's opposing arch to limit movement of the tooth toward the  
opposing tooth;  
the second flange comprises a central slot through which the third portion of  
the retaining clip moves about the central portion of the second flange; and  
15 the third portion of the retaining clip covers substantially all of a lingual  
surface of the central portion of the second flange.

15. A method of using self-ligating lingual orthodontic brackets to correct improper positioning of a person's teeth, comprising:

affixing self-ligating lingual orthodontic brackets to teeth in a person's arch, each bracket comprising:

5 a base comprising a base surface adapted for coupling to a lingual surface of a tooth in the person's arch;

a first flange extending generally horizontally from the base in a generally lingual direction;

10 a second flange extending generally horizontally from the base in a generally lingual direction, the second flange separated from the first flange generally vertically toward the person's occlusal plane to define a generally transverse wire slot that is exposed on a lingual side of the bracket and adapted to receive an orthodontic wire inserted into the wire slot from the lingual side of the bracket;

a clip slot formed generally vertically through the bracket; and

15 a flexible retaining clip adapted to secure the orthodontic wire within the wire slot in a self-ligating manner, the retaining clip:

comprising a first portion positioned generally vertically and adapted to move generally vertically within the clip slot toward or away from the occlusal plane, a second portion extending generally horizontally from the first  
20 portion in a generally lingual direction about at least a central portion of the second flange, and a third portion extending generally vertically from the second portion in a direction generally away from the occlusal plane about at least the central portion of the second flange;

25 adapted to apply a resilient force to an object positioned between the first and third portions;

adapted to be urged generally vertically toward the occlusal plane from a closed position to an open position to expose the wire slot to receive the orthodontic wire, the third portion being biased against at least the central portion of the second flange when the retaining clip is in the open position as a result of the  
30 applied resilient force; and

adapted to be urged generally vertically away from the occlusal plane from the open position to the closed position to secure the orthodontic wire

within the wire slot, the third portion being biased against the orthodontic wire when the retaining clip is in the closed position and the orthodontic wire is secured within the wire slot as a result of the applied resilient force;

for each bracket, with the retaining clip of the bracket in the open position and  
5 the third portion of the retaining clip biased against at least the central portion of the second flange due to the applied resilient force, inserting an orthodontic wire into the wire slot from the lingual side of the bracket;

for each bracket, urging the retaining clip of the bracket generally vertically away from the occlusal plane from the open position to the closed position to bias the  
10 third portion of the retaining clip against the orthodontic wire as a result of the applied resilient force to secure the orthodontic wire within the wire slot of the bracket; and

applying force to the teeth via the orthodontic wire and brackets to enable gradual correction of the improper positioning of the teeth.

15 16. The method of Claim 15, wherein:

the method further comprises urging the retaining clip generally vertically toward the occlusal plane from a closed position to an open position to expose the wire slot to receive the orthodontic wire;

the first portion of the retaining clip comprises an angled free end extending  
20 generally vertically out of the clip slot in a direction generally away from the occlusal plane; and

the angled free end of the first portion of the retaining clip contacts the bracket to limit movement of the retaining clip toward the occlusal plane as the retaining clip is urged from the closed position to the open position.

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17. The method of Claim 15, wherein the second portion of the retaining clip contacts the central portion of the second flange to limit movement of the retaining clip away from the occlusal plane as the retaining clip is urged from the open position to the closed position.

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18. The method of Claim 15, wherein:  
the central portion of the second flange comprises a detent; and  
the third portion of the retaining clip comprises an angled free end that rests  
within the detent of the central portion of the second flange when the retaining clip is  
5 in the open position to prevent unintentional movement of the retaining clip away  
from the occlusal plane.

19. The method of Claim 15, wherein the first flange comprises a recess  
that receives a free end of the third portion of the retaining clip when the retaining clip  
10 is in the closed position and limits movement of the free end of the third portion in a  
generally lingual direction to prevent the orthodontic wire from escaping from the  
wire slot when the retaining clip is in the closed position.

20. The method of Claim 15, further comprising inserting a tool into a  
15 notch in one of the first and third portions of the retaining clip to urge the retaining  
clip toward the occlusal plane from the closed position to the open position.

21. The method of Claim 15, wherein the second flange provides a bite  
plate that contacts an occlusal surface of an opposing tooth in the person's opposing  
20 arch to limit movement of the tooth toward the opposing tooth.

22. The method of Claim 15, wherein:  
the bracket further comprises a hook extending from a side of the first flange  
in a direction generally away from the occlusal plane; and  
25 the method further comprises engaging a ball-shaped free end of the hook with  
an elastomer to pull the bracket in a generally transverse direction toward an adjacent  
bracket.

23. The method of Claim 15, wherein the tooth is an upper tooth in the  
30 person's upper arch and the retaining clip is urged generally up into the closed  
position.

24. A self-ligating lingual orthodontic bracket, comprising:
- a base comprising a base surface adapted for coupling to a lingual surface of a tooth in a person's arch;
  - a first flange extending generally horizontally from the base in a generally lingual direction;
  - a second flange extending generally vertically from the first flange in a direction generally toward the person's occlusal plane
  - a third flange extending generally horizontally from the second flange in a generally labial direction, the third flange separated from the first flange generally vertically toward the person's occlusal plane to define a generally transverse wire slot that is exposed from a generally labial direction and adapted to receive an orthodontic wire inserted into the wire slot from the generally labial direction;
  - a clip slot formed generally vertically through the second flange; and
  - a flexible retaining clip adapted to secure the orthodontic wire within the wire slot in a self-ligating manner, the retaining clip:
    - comprising a first portion positioned generally vertically and adapted to move generally vertically within the clip slot toward or away from the occlusal plane, a second portion extending generally horizontally from the first portion in a generally labial direction about at least a central portion of the third flange, and a third portion extending generally vertically from the second portion in a direction generally away from the occlusal plane about at least the central portion of the third flange;
    - adapted to apply a resilient force to an object positioned between the first and third portions;
    - adapted to be urged generally vertically toward the occlusal plane from a closed position to an open position to expose the wire slot to receive the orthodontic wire, the third portion being biased against at least the central portion of the third flange when the retaining clip is in the open position due to the applied resilient force; and
    - adapted to be urged generally vertically away from the occlusal plane from the open position to the closed position to secure the orthodontic wire within the wire slot, the third portion being biased against the orthodontic wire when the



retaining clip is in the closed position and the orthodontic wire is secured within the wire slot due to the applied resilient force.

25. The bracket of Claim 24, wherein the first portion of the retaining clip  
5 comprises an angled free end extending generally vertically out of the clip slot in a direction generally away from the occlusal plane and adapted to contact the bracket to limit movement of the retaining clip toward the occlusal plane as the retaining clip is urged from the closed position to the open position.

10 26. The bracket of Claim 24, wherein the second portion of the retaining clip is adapted to contact the central portion of the third flange to limit movement of the retaining clip away from the occlusal plane as the retaining clip is urged from the open position to the closed position.

15 27. The bracket of Claim 24, wherein:  
the central portion of the third flange comprises a detent; and  
the third portion of the retaining clip comprises an angled free end adapted to rest within the detent of the central portion of the third flange when the retaining clip is in the open position to prevent unintentional movement of the retaining clip away  
20 from the occlusal plane.

28. The bracket of Claim 24, wherein the first flange comprises a recess adapted to:  
receive a free end of the third portion of the retaining clip when the retaining  
25 clip is in the closed position; and  
limit movement of the free end of the third portion in a generally labial direction to prevent the orthodontic wire from escaping from the wire slot when the retaining clip is in the closed position.

29. The bracket of Claim 24, wherein at least one of the first and third portions of the retaining clip comprises a notch adapted to receive a tool for urging the retaining clip toward the occlusal plane from the closed position to the open position.

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30. The bracket of Claim 24, wherein the third flange provides a bite plate adapted to contact an occlusal surface of an opposing tooth in the person's opposing arch to limit movement of the tooth toward the opposing tooth.

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31. The bracket of Claim 24, further comprising a hook extending from a side of the first flange in a direction generally away from the occlusal plane, the hook comprising a ball-shaped free end adapted to engage with an elastomer operable to pull the bracket in a generally transverse direction toward an adjacent bracket.

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32. The bracket of Claim 24, wherein the tooth is an upper tooth in the person's upper arch and the retaining clip is adapted to be urged generally down into the open position and generally up into the closed position.

33. The bracket of Claim 24, wherein the orthodontic wire may have either  
20 a circular cross-section or a rectangular cross-section.

34. The bracket of Claim 24, wherein the wire slot and retaining clip are adapted to accommodate any of a plurality of orthodontic wires with different cross-sectional dimensions.

35. A method of using self-ligating lingual orthodontic brackets to correct improper positioning of a person's teeth, comprising:

affixing self-ligating lingual orthodontic brackets to teeth in a person's arch, each bracket comprising:

5 a base comprising a base surface adapted for coupling to a lingual surface of a tooth in a person's arch;

a first flange extending generally horizontally from the base in a generally lingual direction;

10 a second flange extending generally vertically from the first flange in a direction generally toward the person's occlusal plane

a third flange extending generally horizontally from the second flange in a generally labial direction, the third flange separated from the first flange generally vertically toward the person's occlusal plane to define a generally transverse wire slot that is exposed from a generally labial direction and adapted to receive an orthodontic  
15 wire inserted into the wire slot from the generally labial direction;

a clip slot formed generally vertically through the second flange; and

a flexible retaining clip adapted to secure the orthodontic wire within the wire slot in a self-ligating manner, the retaining clip:

20 comprising a first portion positioned generally vertically and adapted to move generally vertically within the clip slot toward or away from the occlusal plane, a second portion extending generally horizontally from the first portion in a generally labial direction about at least a central portion of the third flange, and a third portion extending generally vertically from the second portion in a direction generally away from the occlusal plane about at least the central portion of  
25 the third flange;

adapted to apply a resilient force to an object positioned between the first and third portions;

30 adapted to be urged generally vertically toward the occlusal plane from a closed position to an open position to expose the wire slot to receive the orthodontic wire, the third portion being biased against at least the central portion of the third flange when the retaining clip is in the open position due to the applied resilient force; and

adapted to be urged generally vertically away from the occlusal plane from the open position to the closed position to secure the orthodontic wire within the wire slot, the third portion being biased against the orthodontic wire when the retaining clip is in the closed position and the orthodontic wire is secured within  
5 the wire slot due to the applied resilient force;

for each bracket, with the retaining clip of the bracket in the open position and the third portion of the retaining clip biased against at least the central portion of the third flange due to the applied resilient force, inserting an orthodontic wire into the wire slot from the labial side of the bracket;

10 for each bracket, urging the retaining clip of the bracket generally vertically away from the occlusal plane from the open position to the closed position to bias the third portion of the retaining clip against the orthodontic wire as a result of the applied resilient force to secure the orthodontic wire within the wire slot of the bracket; and

applying force to the teeth via the orthodontic wire and brackets to enable  
15 gradual correction of the improper positioning of the teeth.

36. The method of Claim 35, wherein:

the method further comprises urging the retaining clip generally vertically toward the occlusal plane from a closed position to an open position to expose the  
20 wire slot to receive the orthodontic wire;

the first portion of the retaining clip comprises an angled free end extending generally vertically out of the clip slot in a direction generally away from the occlusal plane; and

the angled free end of the first portion of the retaining clip contacts the bracket  
25 to limit movement of the retaining clip toward the occlusal plane as the retaining clip is urged from the closed position to the open position.

37. The method of Claim 35, wherein the second portion of the retaining clip contacts the central portion of the third flange to limit movement of the retaining  
30 clip away from the occlusal plane as the retaining clip is urged from the open position to the closed position.

38. The method of Claim 35, wherein:  
the central portion of the third flange comprises a detent; and  
the third portion of the retaining clip comprises an angled free end that rests  
within the detent of the central portion of the third flange when the retaining clip is in  
the open position to prevent unintentional movement of the retaining clip away from  
5 the occlusal plane.

39. The method of Claim 35, wherein the first flange comprises a recess  
that receives a free end of the third portion of the retaining clip when the retaining clip  
10 is in the closed position and limits movement of the free end of the third portion in a  
generally labial direction to prevent the orthodontic wire from escaping from the wire  
slot when the retaining clip is in the closed position.

40. The method of Claim 35, further comprising inserting a tool into a  
15 notch in one of the first and third portions of the retaining clip to urge the retaining  
clip toward the occlusal plane from the closed position to the open position.

41. The method of Claim 35, wherein the third flange provides a bite plate  
that contacts an occlusal surface of an opposing tooth in the person's opposing arch to  
20 limit movement of the tooth toward the opposing tooth.

42. The method of Claim 35, wherein:  
the bracket further comprises a hook extending from a side of the first flange  
in a direction generally away from the occlusal plane; and  
25 the method further comprises engaging a ball-shaped free end of the hook with  
an elastomer to pull the bracket in a generally transverse direction toward an adjacent  
bracket.

43. The method of Claim 35, wherein the tooth is an upper tooth in the  
30 person's upper arch and the retaining clip is urged generally up into the closed  
position.